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—THE—
CANADIAN ARCHITECT AND BUILDER,
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THE annual meeting of the Province of Quebec Association of Architects will be held in the city of Quebec on Tuesday, the 8th of September.

THE plumbers, gas and steamfitters of London, Ont., having failed to induce their employers to reduce their hours from 54 to 50 per week and increase their wages from 23 to 25 cents per hour, have for the past three weeks enjoyed a holiday, while the master plumbers have been forced to take off their coats and "earn their bread by the sweat of their brows." The strike, which promises soon to cease, has brought a few outsiders to the city, and these, with the repentant strikers, who do not like the idea of resting without pay, are managing to keep pace with the work. The time chosen was inopportune, as most of the spring contract work has neared completion, and none of the trades have been troubled with too much work this year.

THE extent to which new and superior quality building materials have come into use within the last ten years, is well illustrated by the growth of the Canadian pressed brick industry. Five years ago pressed brick was a rarity. The few required were imported from the United States, and cost something like $40 per thousand, exclusive of duty. Three or four years ago some enterprising Canadians began to manufacture pressed brick, and in a short time were able to offer an article which stood a fair comparison with the imported brick, and at half the price. The result is a wonderfully increasing demand, and a multiplication of manufacturers from one to four or five. Not only is pressed brick everywhere to be observed in the cities, but from the towns throughout the country there also comes a considerable demand. The facilities for cheap production are such, that it is believed Canadian manufacturers would be able to compete with advantage for business in some of the American cities near the border.

THE architects of the Australian colonies are fighting a battle for incorporation and registration similar to that in which the Ontario Association of Architects was recently engaged. Our contemporary, the *Australasian Builder*, is doing yeoman service on behalf of the movement, and in its issue of May the 9th, prints the full text of the Ontario Architects' Act. The Victoria bill includes several of the clauses which were thrown out by the Ontario Legislature, such as that no person but a registered architect shall be entitled to recover at law for professional charges, also that forbidding public bodies from employing any but a registered practitioner; and one that no certificate shall be valid unless the person signing the same be a registered architect. We shall follow with a great deal of interest the fortunes of this bill. It is our hope that the architects of the antipodes may not only secure legal recognition, but legislation which will be of more assistance to them in their efforts to place the profession on a proper footing, than that which obtains in Ontario.

A REPORT has recently been made by Sir John Fowler to the directors of the Brighton Railway Company in England, on the condition of the bridges on the Company's lines. The result of Sir John Fowler's inspection has given rise to alarm for the public safety. The report intimates that no less than eighty bridges have been found to be so defective as to render their entire reconstruction necessary within a period of two or three years. The demand is made for a Royal Commission to define the enduring qualities of iron under the stress of moving loads,

and the kind of material and method of construction to be employed in the erection of railway bridges. Seeing that in no country in the world, in proportion to population, are there so many railway bridges as in Canada, this subject comes home to us with striking interest. The Minister of Railways and Canals might profitably consider whether in the interest of human life, some method of official enquiry into the condition of railway bridges throughout the Dominion should not be made at regular intervals.

A REFERENCE was made last week in one of the Toronto dailies to a test by the firemen of the water pressure in the early morning, before any serious drafts were made upon it either for domestic or business purposes. It was found that the water barely reached the roof cornice of the new Canada Life building, and that only in a fine spray. The writer then goes on to suggest the advisability of purchasing engines of sufficient power to throw an efficient stream over the highest building. But we would suggest a more excellent way. The larger cities have all passed through trying experiences with regard to conflagrations which have raged in high buildings. Whole brigades of powerful engines, handled in the most admirable manner, have failed to cope with the devouring element. The only safeguard is to compel all parties erecting structures higher than say 60 feet, to adopt either slow-burning or fire-proof methods of construction —preferably the latter—and the sooner civic authorities wake up to this fact, the better it will be for the safety of property and the best interests of all concerned.

THE question of letting contracts in bulk or to the separate trades was discussed lately by the New York Armory Board. Mr. Thomas, their architect, warmly espoused the system of letting to separate trades, asserting that the figures would be lower than if received in bulk ; also that as he had given a bond guaranteeing that the cost should not exceed a certain amount, his advice should be followed. But the Board ordered otherwise, basing their reasons on the delay caused on another building, where the various trades endeavored to throw the blame upon each other. There is no doubt that as a rule it is to the advantage of the proprietor in every respect (except, perhaps, in regard to that of delay), that the architect should deal directly with the contractor for each trade—a better class of men will tender for the work, knowing that they will have fair treatment and no trouble in obtaining their money. The tendency with a contractor is to increase his profits by securing very low figures from sub-contractors, who in turn will do their work in an inferior manner, hoping that the architect will not be too hard upon them. That unfortunate individual has too often to let work pass for the sake of completing the building in time, that he would otherwise condemn.

THE tests of building stones on the new and interesting machine at the School of Practical Science were commenced last week by Professor Galbraith, with Mr. Rosebrugh as his assistant. The Ontario Association was represented by Mr. Townsend, by whose efforts the collection of stones was obtained, and by Mr. Curry, while other members dropped in from time to time. The work had to be postponed after a portion of the blocks had been tested, the remainder not having been properly squared, a slight inequality even interfering with the accuracy of the tests. We will give, in a later issue, the data obtained, in a form which we hope will prove useful and interesting to all connected with the building trades. It is the aim of Professor Galbraith and the Ontario Association to furnish data which will be thoroughly reliable, and as it is the first scientific attempt in this line, it is not advisable that it should be rushed through with undue haste and at the expense of thoroughness and accuracy. The samples are now being put in proper form. We understand there are still some quarries unrepresented. It will be to the interest of all dealers who have a good article to send sample, as the result will be published far and wide.

THE Building Committee of the Montreal Board of Trade have opened the tenders for their proposed new building, but have not yet yet let the contract. It is rumored that the tenders have far exceeded the appropriation (by more than $100,000 in fact), and that all the contractors who tendered have had their guarantee cheque returned. It is also rumored that one or two Montreal architects who were among the competitors threaten to sue the Board of Trade for the amount of their prospective fees, they having obtained estimates from reliable contractors guaranteeing to erect the buildings from the designs of these rejected competitors for the amount named in the conditions of the competition. It is reported that the Board of Trade will fight these claims with the plea that they made certain modifications or additions to the accepted design, and that they had a perfect right to thus waive the original conditions. It is also whispered that the enormous increase of cost has frightened the subscribers to the building scheme, and that the enterprise is going begging for funds. No doubt the history of the dealings of the Building Committee of the Toronto Board of Trade has put the Montreal men upon their guard. We are of the opinion that if the Montreal Committee had patriotically dealt with Canadian architects the feeling of insecurity in regard to abnormal cost would have been allayed, and that funds would have been forthcoming and contracts let by this time.

CANADIAN city, town, and even village municipalities are rapidly falling into line with the scientific progress of the age by adopting improved systems of water supply, drainage, etc. These improvements have such an important bearing upon the public health and comfort that municipalities which fail to keep pace with the march of improvement in this direction cannot expect to long retain their prosperity. The change which is thus taking place is one which adds very considerably to the importance and responsibility of municipal engineers, who find themselves called upon to solve many new and difficult problems. In view of this, might there not be a field of usefulness awaiting a Canadian association of municipal and county engineers, such as exists in England? We have our Canadian Society of Civil Engineers, and of Medical Health Officers, which in a measure discuss municipal engineering problems, yet we imagine there are many questions with which the municipal engineer will be called upon to deal, that have never engaged the serious attention of the Societies mentioned, and that might be exhaustively and profitably considered by an association exclusively organized for the purpose. From the address of the President at the annual meeting, we learn that the "Incorporated Association of Municipal and County Engineers," was organized with a membership of 33 in 1873. To-day the membership amounts to 400, and embraces not only the municipal engineers of almost every town in England, but also gentlemen holding official appointments in Canada, Australia, China, and other countries.

Fault should not be found with the architect who strives to impart originality of design to his buildings. The streets of most of our towns and cities have been deprived of many interesting features which they might have exhibited if originality had oftener marked the work of architectural designers. Unfortunately, however, there is another side to this subject. It is shown in the increasing attempts of persons with little or no knowledge of the past history of architecture, to produce something new, and the wretched results which in too many instances follow such attempts. A walk around the streets of Toronto will reveal innumerable architectural absurdities, and unfortunately, they are to be found about as frequently in the new buildings under construction as in those of past years. The numerous two-storey frame structures on Yonge street for years served to detract from the importance of that thoroughfare, and citizens who took pride in the progress of the city, looked anxiously to see them supplanted by new buildings of pleasing design. Some of these old buildings are now being removed, but in some instances the new ones taking their place are sadly disappointing. In fact some of them are less attractive than the old ones, which is saying but little to their praise. It is surprising that the owners of such valuable property should be short-sighted to their own interests, and offend the public taste of this and coming generations by permitting such structures to be erected. Let us have originality in design, provided it is of a different order from that to which we have referred. Otherwise, let us continue to copy old examples until we shall have learned something of the history and principles of design.

THE system of appointing an assessor or professional judge in English architectural competitions is gaining ground, and marks a new era in the history of the craft and in the education of the public. The aforesaid public is, we hope, beginning to see that men of ability will not put themselves unreservedly into the hands of every Tom, Dick and Harry who may happen to be foisted on to a building committee regardless of fitness for the position. The next point that should be strenuously insisted upon by architects, is the naming of the judge or judges simultaneously with the announcement of the competition, and that the terms of competition should be drawn up by or with their advice. When this procedure is followed, the competitor knows what he is about and what to expect. With regard to the tendency to pander to the tastes of the assessor, "Goth," in *Building News* "Wayside Notes," puts it naïvely when he says :—"There is such a thing as—there has, indeed, been too much—pandering to the tastes of the assessor, but short of this it is to the common advantage of competitors to know that Mr. Dog-tooth or Mr. Egg-and-Tongue has been appointed. Panderers, doubtless, often deceive themselves, as there must be many men who would rather be prejudiced against competitors that they suspected of pandering to their known views on architectural design. My own reason for liking to see the name of the assessor beforehand is, that one is prevented from wasting time on a subject of which the assessor may be ignorant. Often architects, unlearned in the design of the class of buildings to which a certain competitor refers, have been appointed assessors, and I can say from experience that it is no joyful news to learn that an assessor has been appointed to judge plans who knows about as much about the special design of the particular building as a milkman knows how to make milk."

Apropos of the above remarks on competitions comes the news that the government of New South Wales has decided to throw open to competition all public buildings in future erected in the colony at a cost of £10,000 and upwards. The conditions have been prepared by a commission of prominent architects, including the government architect, and the advertisement of the first competition, a gaol to cost £16,000, has been published. We note as part of the conditions that the drawings will be placed before a board of advisers consisting of (*a*) the government architect, (*b*) an officer from the department for which the special building is intended, to be appointed by the ministerial head of that department, and (*c*) one non-official and non-competing architect to be chosen by the Minister of Public Works. The local architects are, like their English confreres, very desirous of having all the names of the board published, indicating that there seems to be world-wide consensus of opinion on this point. The conditions are on the whole very satisfactory and such as a professional board would be expected to draw up.

M. BRINCOURT, in Planat's "Encyclopédie de l'Architecture et de la Construction," has an article on the architecture of the United States, which is most interesting as being the estimate of a representative of a nation which has long since through its ateliers crystalized the art of architecture into a classic conservatism which only a comparatively few bold spirits have been able to break through. To him, therefore, the point of interest is, that this architecture represents the manners and civilization of a new people, ingenious, practical, with no past and no school behind them. Their ideas have been borrowed from the various countries which they have come in contact with, and they have copied, assimilated and modified to suit their own ideas and tastes. M. Brincourt then proceeds to cite a few examples of religious, civil and private architecture. He regards the first as the least original or characteristic, especially in edifices of importance, and he traces the influence of the French school, but with English inspirations attributable to the similarity of religious beliefs and forms. He looks upon the designs of the less pretentious chapels as the embodiment of odd and unexpected conceptions, some of which indicate on the exterior no religious use whatever. With regard to the civil architecture of the United States, he notes the prevailing tendency to what he terms the Anglo-Romanesque, while the classic has its devotees, reproducing European buildings, which he thinks look somewhat strange and out of place in their new settings. Some of the tall office buildings are considered interesting, and their architects are complimented for the, on the whole, successful solution of a most difficult problem. The planning of buildings for athletic associations, with their complications of bathing conveniences, gymnasiums, club rooms and parlors, is set down as distinctively American, as is also the planning of the monster hotels, such as the De Soto, at Savannah and the Ponce de Leon, at St. Augustine.

Coming now to private, or domestic, architecture, M. Brincourt abounds with praise. To use his own words, it is "varied and original, spirited and graphic," and "possesses all the qualities needed to attract and charm." He thinks that even in cities, where the buildings must be kept in line and are limited by stiff party walls on either side, a successful treatment is obtained by means of cleverly managed projections and other features, giving individuality of character to the various houses. Then when economy of space ceases to be a *sine qua non*, and the architect plans for the suburbs or the country, what he terms to be the "suppleness" of the designer displays itself, and this suppleness is, he thinks, employed with much charm in their villas and cottages. Confusion and restlessness, he considers, result from the attempt, especially in pretentious houses, to produce silhouette and pretentious effects. The favorite architectural elements appear to him to be the tower and the porch, the omission of the former feature seeming to be the exception in all houses above the ordinary. He closes as follows :—"To recapitulate, the architecture of the United States, made up from different schools and styles, and adapted to new and special needs, by an essentially practical and industrious people, is full of instructiveness. Not feeling forced to follow traditions which are often incompatible with modern needs, the American architects are right in attempting merely to satisfy, as artistically as possible but also in the most practical way, the requirements of their present mode of life ; and it is along that line that their productions may be studied with greatest profit."

A SERIOUS CASE.

TORONTO, August 4, 1891.

Editor CANADIAN ARCHITECT AND BUILDER.

"ARCHITECTS AND THE LAW."

SIR,—I should like to call the attention of the profession to a case recently decided in the English courts against an architect, which, if it is to form a precedent, is a very dangerous one. Moott v. Newmarch ; tried 10th July, 1891 ; London. The plaintiff Moott is a doctor, and he desired to have his surgery, which is built at the side of his house, enlarged. He employed the defendant, Newmarch, an architect, to carry out the work for him.

There were some houses in the rear of the plaintiff's surgery, and the owners obtained an injunction to prevent the doctor from proceeding with the enlargement of his surgery, on the ground that the light and air to these houses would be interfered with. The doctor could not resist the application for the injunction, and had to pay the cost, amounting to £277 5s. 10 d. He then sued his architect, Newmarch, for this amount as damages, on the ground that he had been negligent in not obtaining the consent of the owners of the houses in the rear to the proposed additions to the surgery.

The architect denied that there was any duty upon him to to obtain such consent, and he counterclaimed £125 for professional services. To meet the counterclaim the plantiff paid into court £66 11s.

The jury, after listening to the case for a day and a half, in fifteen minutes decided that the architect *was liable*, and as to the counterclaim, the sum paid into court was sufficient.

Such a responsibility has never before been thrust upon architects, but now that this decision has been given, it behooves architects to remember that they must either make themselves acquainted with all the rights and privileges of all "adjoining owners," and to do this must spend a great deal of time in hunting up and perusing leases, deeds of sale, and all such documents, or they must enter into an agreement in writing with the client to the effect that the responsibility of interfering with any such rights rests upon him (the client), and not upon the architect.

Yours truly,

R. W. GAMBIER-BOUSFIELD.

OUR ILLUSTRATIONS.

PROPOSED NEW Y.M.C.A. BUILDING, KINGSTON, ONT.—J. B. REID AND ARTHUR ELLIS, ARCHITECTS, KINGSTON.

The materials will be brick, with rock-face stone trimmings. The interior finish will be plain, but of good quality.

SKETCH FOR AGED WOMEN'S HOME, IN BELMONT STREET, TORONTO.—WM. R. GREGG, ARCHITECT.

The materials to be used in the construction are: red brick, with Ohio stone trimmings. The basement contains kitchen, laundry, boiler room, root cellar, etc. In the attic are bedrooms, storage rooms and bath room.

ENTRANCE TO RESIDENCE OF MR. GEO. G. BOOTH, TRUMBULL AVENUE, DETROIT, MICH.—CARVED IN PORTAGE ENTRY RED SAND STONE.

HOUSES ON BRUNSWICK AVE., TORONTO—E. B. JARVIS, ARCHITECT, TORONTO.

THE ONTARIO ARCHITECTS' ACT.

The *Australasian Builder* in an article on "The Registration of Architects," expresses its opinion of the Ontario Architects' Act in the following terms:

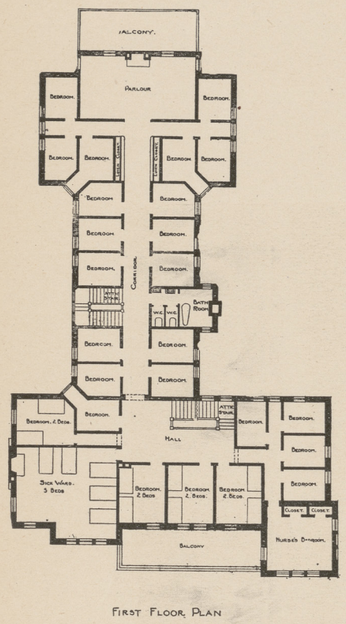
"And now let us turn to the Canadian doings. Setting aside a great deal of technical machinery for the carrying into effect of the principles of legislation, either enacted or desired—matters which eminently concern the parliamentary draughtsmen and the lawyers, but scarcely the architetural press—we find the variations made by the Parliament of Ontario, in the "Ontario Architects' Act," from the provisions put forward by the Ontario Association of Architects in their draft Bill, to be all in the direction of public freedom and liberty of action. But, whereas the very object of the incorporation or registration of professional bodies is to place a salutary check, in the interests of the public, on such extremely latitudinarian liberty, or license, the emendations made by the Ontario Legislature are partly beneficial and partly the reverse. In the former category may be placed the rejection of the provision for a two years' practice of architecture previous to the passing of the Act, as an essential condition of registration, and the recognition of a shorter term of articles than five years when the indenture was made before the passing of the Act; the permission given to the student, under certain conditions, in clause 24 (3), to serve a portion of his time with an architect during the vacations of the School of Architecture (by which he would probably save a year); the indulgence for registration in cases of illness, absence, or inadvertence; the legal allowance of the same fees to architects as are paid to land surveyors, when attending any court as witnesses; and the provisions contained in clause 30 (3) for prosecution under the Act. The omissions from the draft Bill, however, made in the Act are far more prejudicial than the provisions we have just alluded to can be of benefit. The deprivation of the Council of the proposed powers to dispense, in special cases, with their ordinary rules, &c., is a needless dictation of hard-and-fast procedure entangled in red-tape; but of far greater moment is the omission of clause 26 of the draft Bill. At the risk of appearing undemocratic in this ultra-democratic country, we feel called upon to maintain most strongly the paramount importance of drafting into not alone the architectural profession, but into all professions (as distinguished from mere trades), lads only who can show that they have received a fairly liberal education, and who may, therefore, be presumed to possess at least the rudiments of culture and some of the first instincts of a gentleman. While we strongly advocate the recognition for the nonce of the *status quo* in the profession, we still more strongly plead for the most jealous guarding of its gates from ignorance and snobbery in days to come.

But there are other omissions from the Act, of no less grave importance. One of these is the draft provision that only registered architects should be able to recover charges in a court of law. If a Registration Act is to be anything at all, it should be a reality, and not a farce. And, therefore, this very provision would indirectly be one of the heaviest penalties for non-registration that could be devised, and would do more than anything else to bring public discredit on the unregistered (because incompetent) architect. To very much the same effect is the omission of the draft clauses 35, 38, and 47. If it be understood that all competent architects are registered—and this certainly is the view held by most of the genuine advocates of registration—but if, all the same, unregistered architects—"Dick, Tom, or Harry"—may be appointed by public bodies to very important and responsible public offices; if valid certificates may be granted by unregistered men; and if the Council be deprived of the power to cancel the registration of an architect convicted of felony or misdemeanor, or even "of conduct infamous in a professional respect," what becomes of the safeguards to the public, what of the honor of the profession? It seems to us that by their rejection of these clauses the Ontario Parliament have stultified and rendered almost nugatory an Act that in many respects is admirable; and this course surprises us the more because of their rejection of Clause 36. The inclusion of this clause would have provided a salutary check upon the rapacity of unprincipled architects, by restricting them (except by special arrangement) to the maximum as well as the minimum charges laid down in the tariff of the Ontario Association. The professional charges formulated by most of the leading architectural bodies throughout the English-speaking world are now so fair and equitable as between architect and client, that the public, as well as the profession, should be protected from imposition, and justice should be meted equally to both parties. In conclusion, we have only to express a hope that the Ontario architects will succeed in soon obtaining from their Legislature an amending Act, and that our architectural friends in Melbourne and Victoria generally will give the various matters we have placed before our readers their careful consideration, with the view of making the Victorian Registration Bill, whenever it becomes law, as perfect, just and workable a measure as is possible.

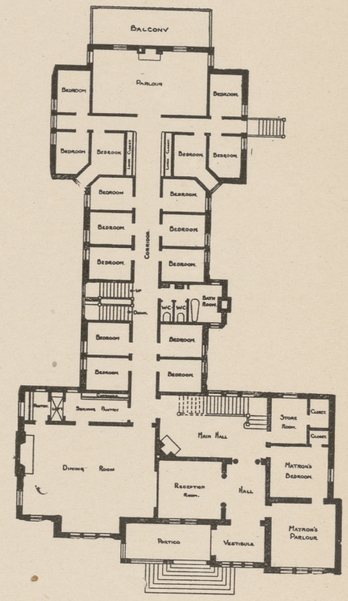
MANUAL AND TECHNICAL TRAINING OF ARCHITECTS AND ENGINEERS.*

KNOWING that many things in the early education of architects and engineers need much reform, I will endeavor to point them out in the clearest possible form, and would remind you that, although these are my humble opinions, they are based upon much experience of the practital working man, and the theoretical and practical architect and engineer. That it is necessary for the architect or engineer, as the case may be, to have done some actual work at one or more trades connected with his calling or profession, you may admit, although I can hardly hope to make you or myself believe that he shall necessarily be an expert, for if he does justice to the other part of his profession, I hardly think that that is attainable. But judging from some of our young architects of note, over the border, who have recently been gaining honors in the old world, you will see that even an architect can be a skilful artisan, or shall I say an artisan can become an architect. . . . . Do you wonder at the number of unemployed draftsmen or at the low wages paid to a great many, when such cases as the following occur: A tradesman, or someone of limited means, wishes to article his boy (who has shown an aptitude for drawing) with an architect, and pays a premium. No wages are paid, of course, for three years or more. After a little picture-making on the part of the boy, the father knows a man who wants to put up a pair of shops, a cottage, or some other building, and does not want to waste money over an architect. He knows what he wants, and the boy knows what he has done in the office, for which his employer has charged 10 guineas; why, he will do it for £3, or say £2 to secure the job, and as no local board exist, these wretched botches of buildings meet your eyes in every suburban street. No supervision of the building is necessary—the Building Society's surveyor does that when the Society makes progress payment; do you wonder these buildings sometimes fall and kill somebody, and that jerry builders and jerry architects exist? This is how they are made. It is high time that some legal protection was given to the profession, and one of the things that will do most to help it is a higher standard and better education among ourselves. . . . Granted the hand becomes a little unsteady through work, it is more than compensated for by the practical knowledge gained and the respect ensured from the artisan and builder who work under him (the architect). It is as the president of the kindred Association of New South Wales pointed out: the brain-worker must gain more practical knowledge. The hand-workers are already in the field gaining more theoretical knowledge, cultivating the sciences and arts that pertain to their trades and callings. And the same field—thanks to some noble benefactors and a liberal Government—is open to you likewise. The advancement and enlightenment of the artisan does not mean less respect and deference to the architect, unless you wilfully waste your time and opportunities. What artisan can respect glaring ignorance on the part of the master-mind? If the designer of the work show gross ignorance in construction, it places him to a great extent in the power of the builder. A bad drawing from the office soon gets known all over the building. The foreman gets out of temper with it, and the workman gets hold of it: his *practical knowledge* is doing the work, and the respect and love due to the architect vanish. I think one of the first things necessary is that more attention should be paid to the groundwork of the pupil. To begin with, he should be a good writer, a fair arithmetician; then he should have a knowledge of decimals, fractions, square and cube root, and mensuration, be able to work out a simple equation in algebra, and be conversant with at least the first three books of Euclid; he should have a knowledge of practical, plane, and solid geometry, and free hand drawing, elementary physics, practical mechanics, and elementary chemistry. Many, I know, are in favor of the pupil going to a builder for a few years. But I think in these days, when University workshops, and technical schools and colleges are in every large town, this (shall I say waste of money?) can to a great extent be dispensed with. He can learn to make the various joints in carpentry and plumbing; to lay brick and mortar; to work stone at the banker; model in clay, take casts; work in iron from forge to lathe; learn to carve in wood or stone. Building construction, architecture, theoretical and applied mechanics, all are taught, not merely in theory only, but the laboratory and workshops are replete with all conveniences for practical manual work, under the superintendence of professors in each branch. Truly, gentlemen, with these advantages to your hand, you can mould the pupil of the future to your wish. A knowledge of tools and construction is indispensible to all, to say nothing of what is gained in health by their use after stooping all day over the drawing table or writing desk. Another thing I think both architects and engineers err in—their pupils do not see enough of the jobs. They should be sent at all convenient times to assist in supervising the digging out of the trenches and excavations; to see that the fall and levels for drains are correct, the joints in the earthenware pipes made. I dare say many will smile at this,

* From a paper read before the Architectural and Engineering Association of Victoria, by B. F. Storer, April 20th, 1891, and published in the *Australasian Builder*.



FIRST FLOOR PLAN



GROUND FLOOR PLAN

SKETCH FOR AGED WOMEN'S HOME IN BELMONT STREET, TORONTO, ONT,

W. R. GREGG, ARCHITECT, TORONTO.

PROPOSED Y. M. C. A. BUILDING, - - - - KINGSTON, ONT.

J. B. REID AND ARTHUR ELLIS, ARCHITECTS, KINGSTON.

Houses on Brunswick Ave.
for F. C. Jarvis Esq.
E. B. Jarvis Archt

Entrance to Residence of Mr. Geo. G. Booth,
Trumbull Ave., Detroit, Mich.

and say—"But the clerk of works does that." True; but who is to see that the clerk of works does it? Again, he should see the mortar made, handle the bricks, and be instructed how to test them to see if they are sound and well burnt, to see the timber is free from sap knots, shakes, and other defects, and the joints in the bricks properly flushed; the house built to required conditions. The iron works should also be visited, to see the girders rivetted; the preparation of piers and approaches, to see the men handle the work and put it in position. Many a lesson will be learned that will be of great value to the pupil when his turn comes to design. The stone quarries and clay pits should not be omitted. The saw-mill and timber yard are a very large factor in building. The conversion and manipulation of timber in all its branches is a study itself; he should study our colonial timbers as well as the imported. I have to speak well of the timbers grown here, and they will compare with any imported—if given a fair show and the same treatment as their rivals. . . . . I have endeavored to show you the stumbling blocks that have been so much in the way in the past; holding that when the student takes up the few things I have stated, a better understanding will come to architect, engineer, and artisan; that the noble aim of the one will be reflected on the other, to enable him to produce something grand; and, carrying the impress of the master-mind on one hand, and the skilful execution on the other, to show the soul of both. I have suggested study, you will need it. But the question is what to study; what to do? Surely there is plenty. But that is too much like the work already in hand. Then spend your spare time in construction. Get some wood bricks, and build English, Flemish, or colonial bonds. You will be taught in your classes, if you understand them, how to test cement, to break beams; try to originate for yourselves. Get a beam of your own, and find the constant; make your own lever, and break the beam. Try to calculate the stresses on the different parts of your roof principals, work them out graphically. As you can draw, this will not involve figures. If you have to draw a large chimney, do not be satisfied with having to draw it; calculate what pressure of wind is necessary to overturn it, and if what you are drawing is stable, work out some of your engineering formula, and see if you can make a formula of your own. I think, gentlemen, if I wanted a man, I should not want to see what he had done, but what he could do now, and would like to see him use his tools and colors in my presence. Now imagine a question like this:—(*a*) Draw two lines crossing each other by means of this square and drawing board, and test them for accuracy, and then (*b*) draw an elevation of a segmental window 6 in. x 3 in. rise of arch 9 in. A geometric drawing must not be made on your paper for the length of your radius. (*c*) Find me the centre of the circle in a semi-circular opening, having two equal semi-circles and the circle intersecting, and fill in and complete the frame for casement sashes. Again, write out a short specification governing the excavation and putting in of concrete foundations for a house at South Yarra. The ground has been tested, and the top is sand and loam. A uniform depth of 2 ft. is required all over to ensure stability, but allow in your specification for extra foundation, if necessary. Now, gentlemen, take this last question. How many young men could sit down and write that in a proper manner? and take some six out of ten ordinary draughtsmen, and see if they could work out *a*, *b*, and *c*, in anything like a proper form; and yet these young men can draw houses and color them on paper—could draw you the five or *more* orders of architecture, if necessary. I am not despising drawing by any means, gentlemen. I rather like it, but a drawing to me must be of some use, and not of the kind that requires the practical knowledge and experience of a builder to make head or tail of it. Stamp your drawings and designs with true art and construction, and you will make the art workman, for he must train himself to understand and carry out your ideas. Get yourselves acquainted with the materials, the tools, and the men, and you will find that your learning is not a dangerous thing.

ONTARIO AND QUEBEC ARCHITECTURAL EXAMINATIONS.

WE have before us the examination papers of the Ontario Association of Architects and those of the Quebec Association. Copies of the former have been sent to all registered students, and we presume the same has been the case with the latter. The Quebec Association calls for only an entrance or matriculation examination, and examination for registration as architect. The Ontario Association interposes an intermediate examination, with the object of keeping the student more continuously at work, spreading the work more evenly, and reducing the tendency to cram towards the end. The examinations of the Quebec Association are to be held in July and December of each year, while those of the Ontario Association will be held for the first time on the 7th of April, 1892. We propose to print both papers in our next issue for the information of any who may not have received copies, and for the sake of the comparisons which may prove of interest to those concerned.

In plumbers' work in England, it is usual to charge sheet lead by weight instead of measurement, although the weight is ascertained by measuring and not by weighing; lead-headed nails, wall-hooks and holdfasts are charged separately and by number; clout nails by the hundred; pipes by the lineal foot; brass-work, pumps, closets, etc., by number.

PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.

THE first examinations of the Association were held on July 30 and 31st, at which Messrs. S. A. Findlay and W. B. Hutchison presented themselves before the examiners for matriculation to enter the study of architecture. They both succeeded in passing this preliminary examination. The Board of Examiners who officiated were Messrs. Roy, Thomas and Taylor.

There was quite a large gathering of architects and students belonging to the cities of Montreal and Quebec present at a meeting held on the evening of Tuesday, August 4th, to formally open the new rooms which have been procured and furnished by the Association at 186 St. James street, Montreal.

Mr. A. C. Hutchison presided, and on behalf of the Council presented the rooms to the Association. The rooms will be open on Wednesday evenings from 7:30 to 10 o'clock, and from 2 to 5 o'clock on Saturday afternoons. It is gratifying to be informed that a Students' Sketch Club has been formed, the officers elect being as follows: President, Mr. Lareau; vice-president, Mr. Wallace; secretary, Mr. P. R. A. Labelle; council, Messrs. MacVicar, Crook, Falbord, Lafole, Harriett and Martel.

Messrs. Hutchison, Raza and Clift kindly lent books and photos for the use of the students for the evening.

The rooms engaged for the use of the Association have been neatly furnished, and the Council are now considering the formation of a library and procuring the different periodicals to lay on the tables. This they expect soon to accomplish, and by the winter to have regular lectures given to the students.

CEILING DECORATION.

IT is a very common fallacy, says *Furniture and Decoration*, that to color a ceiling is to lower it. Still more often is this result expected if projecting ribs or mouldings be added to divide the blank surface. Yet it may easily be shown in argument, as it is constantly exemplified in practice, that the opposite effect is quite as often produced, color being the determining agent. Let us assume the wall of a small private library, twelve feet high, to be hung with one of the embossed leather papers now in frequent use; the pattern brown and gold, on perhaps a warm green ground; the bookcases below, of oak or walnut wood, with their contents, maintaining a quiet similarity of general tone. The cornice is, say, nine inches deep. If you leave it a light tint and the ceiling plain, the room will appear quite nine inches lower than it would were the cornice brown like the bookcase. And if this brown is continued on to the ceiling by means of wooden ribs, the room will gain at least another five inches of apparent height.

The fact is, that the point at which the attention is arrested by a marked contrast is that by which the eye assesses the height; and since the mouldings of the cornice project inwards to the room, even *more* apparent height is gained (than is marked in vertical distance) when the contrast is placed high, since advantage is taken of an apparent perspective.

On the other hand, if it be desired for other reasons to retain the wooden ribs and cornice, yet not to add to the apparent height, a corrective is readily applied in color—either in the form of a narrow frieze of sufficiently emphatic contrast, below the cornice, or by contrasted relief of color at the same point as the cornice itself. Even a line of gilding may suffice.

In the same way the influence of a wide frieze or a dado on the proportions of a room is largely controlled by the coloring. A wide frieze may be used of the same coloring, or even of the same depth of tone as the wall below, without materially affecting the apparent height; but a very small amount of contrast in tone will be sure to tell in the case of a large plain surface. Hence, if a frieze with some contrast is to be used where height cannot be sacrificed, it is essential to place its brightest contrasts as high up and as near the cornice as possible, lest the eye be arrested at the bottom, and the frieze itself, together with the cornice, be relegated to the ceiling. Some rooms are high enough to bear this sacrifice of wall, in which case they largely gain in apparent width and space.

A piece of bluestone 20 feet wide, 24 feet 9 inches long and 10 inches thick, was recently quarried near Kingston, N.Y., and it is claimed to be the largest piece of bluestone ever quarried. It weighs over twenty tons, and is so large that it cannot be used for any purpose until cut.

FIREPROOF ROOF CONSTRUCTION.*

Roof construction of a building is a very important point of fireproof construction, this being the access for fire from above, caused by sparks and flames of any burning neighboring structure. The cheapest and best fireproof construction that can be obtained is gained by the using of T iron and book tile. T irons should be regularly spaced at 18-inch centres, following outline of slopes in roof which is given by the change of level of roof beams upon which T iron rest. These T's should be held in position with iron clamps to roof beams. Two and one-half inch or 3-inch T's are generally used for this mode of construction. The size of the T iron governs the size of the book tile that has to be laid between them. If 2½-inch T's are used, 2½-inch tile must be used. This will bring the top of the tile about ⅜ of an inch over the edge of the stem of the T. The name of book tile is given tile, owing to its shape which is like a book. Good tight joints are obtained by using this tile, as one tile fits in the other, which does away with a vertical joint, which in no case should be allowed on a roof. All tiles should be bedded in mortar and all joints along T's should be slushed up, leaving an entire smooth surface. If a concrete is desired on the roof, upon which tarred paper and gravel is to be laid, it should never be composed of either cinders or crushed stone mixed with sand and cement and water. This is a glaring error which is quite frequently indulged in. No matter how hard you try to get an even surface, you will always find a cinder or stone here and there sticking up, which cuts through the tarred paper, and if walked upon injures the roof. A concrete composed of sand and cement will answer first for this purpose. I cannot see why it is that a concrete is at all necessary. It is better for the roofer and cheaper to apply the tarred paper direct on the tile, using a ply or two more of tarred paper. The cost of same is amply made up by omitting concrete. These remarks apply to flat roofs. Where roofs have a rake not over 45 degrees, a similar construction (as aforementioned) regarding tile work can be followed. If rake of roof is any steeper, each tile should be either wired or bolted to T-irons. This is especially necessary when a part of the roof drops off to a vertical line. One or two-ply of tarred paper should cover these roofs before slates or roof tile are nailed to them. Roofs that are to be used as promenade decks require a stronger construction ; regular floor arches are required here. Trusses that support roofs or carry additional loads should be thoroughly fireproof, as this is a vital point of fireproof construction. If this is not done it exposes the steel and iron to the heat of a fire that may start below them ; consequently a grave danger threatens the destruction of the trusses and whatever they may support. This construction occurs mostly in theatres and large halls. If lower chords of trusses carry a floor, or, in other words, the ceiling of the auditorium, the entire truss should be fireproofed, no matter if it is cut oft from below by this floor or ceiling. If truss is so designed that lower chords show below ceiling-line, they should have especial attention as regards fireproofing.

Suspended ceilings are only used to shut off the roof construction from view, and to give a level ceiling, therefore this construction is very light. Hangers are suspended from the roof-beams, to which T-irons, say 3 times 3 inches, are attached ; spacing latter about 5 feet centres. On these, at right angles to the direction they take, 1-inch T-irons are spaced 12-inch centres. Between the 1-inch T's a light tile is set, to which plastering is applied from below. The general construction of to-day, in our modern fireproof buildings, is to make the ceiling of the last floor as strong as a regular floor. This is done to afford ample storage space and still more important space for pipes, tanks and machinery.

Furring of the inside of outside walls with hollow tile is the most thorough preventative against moisture penetrating through a wall. Each tile should be carefully and regularly set. The thickness of tiles used for this purpose are 1½ inch and two inches. You can therefore see that they depend a great deal on the condition of the wall to which they are to be applied. These walls should be as plumb on the inside as they are on the outside. The use of wood for this purpose should not be allowed, as it is not fireproof or moisture proof. Moisture will affect wood so that dark discolorations will appear on plaster, every lath and strip being clearly shown. Corrugated iron laths and wire lathing are also applied to these walls, but also show the defect of this construction as wood laths. Hollow air spaces are sometimes built in walls to overcome this defect, but that is too expensive a construction and takes more room for walls. The use of porous bricks is the best construction for this purpose. The good qualities of this material have been mentioned before.

Skylight curbs should be built from ceiling-line of last storey, or attic floor, through roof. This is a very important feature of a fireproof structure. No windows should be called for in these curbs. Any light that is necessary for attic should either come direct through roof or through outside walls. These curbs are generally called for to be built of hard glazed tile laid in pure cement mortar, and all joints to be neatly struck. This is supposed to constitute the finish of this part of the work. This construction may look very nice, but it is not fireproof. It is in a dangerous locality, as the draft of any fire that may occur in the storey below will invariably be carried up in this direction, owing to the ventilators in the skylight above. Heat and water will splinter this wall in a very short time. Consequently flames and smoke will have access to the exposed roof construction, water tanks, machinery, vent flues, steam and water pipes, &c., which are located in this part of the building, and will cause dire ruin and paralyze the machinery and sanitary fixtures of the entire building. These skylight curbs should, therefore, be built of a material that will withstand the combined attack of fire and water.

Elevator pockets should be built in every elevator, in order to shut off any smell, flames or smoke that may arise from defective machinery or sanitary arrangements in basement, as a tremendous draught is always rushing up these shafts. This would not be very pleasant or healthy for the occupants of the building. I would even cut off the useful freight elevator from running down to basement, if a partition, which would stop this draught, were not built around same in basement. Such a partition should be set back from elevator, allowing ample room to load and unload freight from same. Elevator pockets should be built as follows :—T iron should be suspended below first floor on hangers about 18 inches or 2 feet below floor beams, spacing T's 18-inch centres and setting book tile between same. Walls of pockets should be built of 3-inch partition tile. Stairs that start from basement and run up to roof should also be cut off from rest of basement by a similar partition as mentioned about freight elevators, for similar reasons.

Especial attention should be paid to see that all beams in pipe-shaft which enclose cylinders of elevators and pipes are thoroughly covered, making due allowance in the framing of your iron work that sufficient space is given to allow of one continuous line of tile. One of these shafts, should a fire get into it, would like a huge chimney. All beams in elevator shaft and stair wells should be covered. If ornamental iron fascias are called for on these beams, then the construction of same should be so designed that the iron contractor is not obliged to knock off fireproofing in order to connect his work to floor beams. The fireproofing of the beams, to which guides are attached, should never be done until guides are in place.

Raised floors for water-closets are used when the construction of a building is of such a nature as not to admit of enough space or room to carry pipes in a distinct and separate passage. These floors are built of either book tile and partition tile or book tile, partition tile and T-irons. When book tile and partition tile are used, partition tile are built in rows, about 18-inch centres, to any height upon which book tile are set. If T irons are used in addition to these tiles, partition tile are spaced in rows about 5-feet centres, upon which T's are set on 8-inch centres for book-tile, which is to be set on T's. This will admit of ample space for all pipes below floor.

Trimming of iron is a very important feature regarding fireproofing—flat-arch construction. All beams should be spaced as regularly as possible. All lower flanges of beams must be on a level line. If beams are all to be level on top, they must be necessarily the same size. Channels or flat bars must be built in walls to receive skewbacks. Flat bars are preferable to channels and are cheaper. The rods should be spaced not more than 6 feet apart, for framing around stair wells and light shafts ; tie rods should be spaced not more than 5 feet apart. If a 15-inch beam is used and a 9-inch arch is to be built between them, tie-rods should be put in 4½ inches from bottom or lower flange, or beam will be tipped over. This is especially dangerous at well holes. If a 9-inch I and a 9-inch arch are used, tie-rods should be placed in centre of beam. For like construction of different sizes of material, a similar proportion of location of tie-rods is necessary. All pipe-shafts, dumb elevators, vents and fireplaces should have iron framework around them. I beams should be used instead of channels for this purpose, as fireproofing can be more securely fastened around them. If a 20-inch girder is level on top with a 9-inch beam, then angles should be rivetted to web of 20-inch girder 9 inches from top flange. The levels of all lintels in relation to floor lines and wood finish, should be carefully studied, raising same enough to allow ample room to apply fireproofing. This will vary at every step from 1 inch to 2½ inches, according to width of lintel. In complicated framing especial attention should be given if fireproofer can apply his fireproofing after everything is framed together. Cases turn up every now and then where it is an impossibility to cover a certain vital point, after all framework is in place, which should have been put in at the same time it was framed together.

Ample sections and levels should be shown on each plan. Proper allowance for sizes of all well holes and elevator shafts should be made. It should be borne in mind that at least 1 inch should be allowed over edge of I beam at these openings for fireproofing. To this you have to make allowance for ornamental iron fascias, &c. Roof beams should be securely tied together with tie rods. This is especially necessary when beams are carried on walls, the weight of parapet and firewalls being in many cases too light and weak to stand the thrust of a series of arches. Anchors and plates should be used quite freely if you have a similar construction. These remarks apply to roofs where arches are used. If floor beams are carried on an iron skeleton which is built in walls, a similar construction is advisable when you get up as high as the attic floors and roofs. When bolts are used for connecting one beam to another, the threads of same should finish flush with the head of the nut, or should be turned around, leaving head of nut on outside. This is imperatively necessary ; if it is not done, most of the skewback or butt has to be cut to pieces as a square bearing is necessary. This will naturally weaken the entire arch.

T irons for roof construction should be spaced regularly. Odd spaces to be worked over next to walls. T's should also be securely fastened to roof beams with clamps. Ceiling should be spaced similar to roof T's. Clamps are not necessary. Spacing of T's for bay construction should be carefully looked after. Odd spaces should always be worked over to end walls. If cantilever brackets occur a similar spacing should be followed, leaving odd space against bracket. Complete sections should be given of this work for every floor if there is any change of levels, showing if T's are bent over flanges of beams or rest direct on them, also showing whether you want a

* From a paper read before the Chicago Architectural Sketch Club by Mr. E. H. Hœppner.

level ceiling or not. If cantilever brackets frame into a plate girder from one side and floor beams from another side, and a level ceiling is required, then rivetheads in lower flanges of girders should be countersunk. Ample room should be given around columns for fireproofing, so that a whole block of tile at least 3 inches thick can be built up independent of clamps or wire. In no instance should the fireproofing around the column be omitted for the sake of lack of room to case same with marble. If all these points would receive a little more attention, many hours of bother and worry would be spared to the party who is designing a building where such construction occurs. All these items should be carefully shown on plans, and superintendents should see that they are carried out as shown.

Plans and specifications for fireproofing should clearly and distinctly specify what is required. Details and section, &c., should be shown of everything required. It is simply appalling to read some of the specifications of this work that are written nowadays. Everything is left for the fireproofer to ferret out as best he can. This is entirely wrong, as it shows either a lack of knowledge of this important branch of building construction or disgraceful carelessness. Each and every different piece of work should be itemized, noting in what stories each kind of work is wanted and sizes of material required. A new specification must be written for every new building, as it is impossible to expect a standard or office specification to hold good regarding construction of work, owing to great variations in design. They are at the same time confusing and misleading, causing an endless amount of bother.

Iron contractors should furnish every piece of iron construction regarding framing work. Small T irons and clamps under lintels should be furnished by fireproofer. All holes for pipes through floors and partitions, &c., should be bored by plumber, gas or steam-fitter. Plasterer should replace all tiles he has displaced during his work. And finally, one and all contractors should be held responsible for any damage to work of another contractor's, any cost of replacing such work to be charged to him and taken out of his final payment. It will be found that, by making such rulings as just mentioned, you will not be continually called upon to settle clashes that occur between contractors and owners of buildings.

For heights of long partitions that are not braced or bonded into any cross partitions, the following rules regarding thickness of partitions should be followed:—3-inch partition, 12 feet high; 3½-inch partition, 13 feet high; 4-inch partition, 14 feet 6 inches high; 5-inch partition, 17 feet 6 inches high; 6-inch partition, 20 feet high; 8-inch partition 25 feet high.

Partitions can be built a great deal higher, but have to be built in such a manner that a space is left between, which is governed by the height desired. This, of course, necessitates two rows of tile, or double partition, as lateral stiffness is what you have to look out for. Smoke stacks and elevator shafts can be built to any height desired if the proper sized tiles are selected.

For spans of flat floor arches, the following sized spans should be used. These spans are the extreme limit which should be allowed. 6-inch arch, 5 feet; 7-inch arch, 5 feet 6 inches; 8-inch arch, 6 feet; 9-inch arch, 6 feet 6 inches; 10-inch arch, 7 feet; 12-inch arch, 7 feet 6 inches. The spacing of beams should not be governed by any sized span given to you, but should be governed by the load that is to be applied on beams. If it is found that strength of beams is sufficient for such spans, that settles all questions regarding same.

If fireproofers are called on to estimate on any work where iron construction is used, they require both iron and general diagram.

HOLLOW WOODEN CONSTRUCTION.

A DEAL of missionary work will have to be done in this country to reform the hollow wooden construction which is the bane of so much of our building, says the *Northwestern Architect*. Prof. John M. Ordway has prepared a valuable table showing the conductivity of many substances, and throws more real light on the real value of the use of air spaces as heat savers than anything which we remember to have seen. The experiments were made uniformly by collecting the heat radiated from 1 square foot of heating surface across or through 1 inch of the materials to be tested, and the heating and absorbing surfaces were maintained as nearly as possible at a difference of 100° F. The results were given in British heat units, the time of each test being one hour. The simple air spaces were tested in two ways—first, with the heating and absorbing surfaces vertical and separated by 1 inch of air; second, with the heating surface above and the absorbing surface 1 inch below it. It will be seen that in the latter case only radiation and conductivity would act, while in the former convection would come in place. As a consequence the heat units transmitted were in the first experiment 108 and in the second (without convection) 43. As the air spaces of buildings are rarely or never placed as in the second experiment, but are relied upon to prevent the escape of heat from a side or underneath, and as a greater thickness of air space would only leave a freer circulation, we may assume that under the conditions usual in building more than 100 heat units would probably be transmitted across an air space for each foot of surface per hour, when the different sides vary in temperature, as in Professor Ordway's experiments. It is worth while to know that under the same conditions of temperature 1 inch in thickness of soft woods (across the grain) or their sawdust will transmit about 75 units, the best slag wool, 50; wool, 36, and hair felt, 56. The list of substances given is a long one, very practical, and, we think, adds much to the exact knowledge hitherto available.

The company recently organized at Owen Sound for the manufacture of Portland cement have expended about $100,000 on buildings and plant.

SANITATION AND HEALTH

HOW TO FIGURE ON PLUMBING WORK.*

FIRST of all, read the specifications through carefully, if there are any specifications, and figure to do the job the way they are written. Don't guess at the intent of the specifications; you might get left, especially if you have never figured for the party before. For instance, a certain plumber figured on a set of specifications some time ago which called for a 6-inch extra heavy pipe running horizontally and out through the roof. He supposed, of course, it was a mistake as the house was only a small one with one bath room, but he did not ask the architect; he was afraid to bother him, and he knew that four inches was absolutely large enough, and he thought the other plumbers would not know any better; so he figured on four inches, and figured it close. He got the job, and much to his surprise and disappointment, the owner was an ex-tunnel contractor and wanted the pipe just that size. In vain our friend talked fouling surface, insufficient flush, etc. The ex-contractor closed his left eye knowingly, and said: "Me bye, that's what I used to tell the railroad company when my tunnel was too small, only I could not work the fouling surface gag." Result: our friend made no money on his job.

In the next place, read the specifications carefully so as to leave out nothing. Measure the length of soil pipe, vent and waste supply and safe waste pipes. Then the writer's plan is to have a schedule of trimmings to go with each fixture; for instance, each tank water closet, put up according to our city plumbing rules, which require 1¼-inch tee, ¼-inch brass ferrule, 15 pounds sheet lead, 6 feet 1¼ flush pipe, 8 feet ½-inch strong lead supply from tank to floor, 2½ feet 2-inch lead vent, and some other essentials such as tack solder, etc. These trimmings, I call them for want of a better name, I have carefully noted down in a small book the net cost of each item and the total cost of all the items. Then if the closet sets on a marble floor, or if any other variation from the standard way of putting up closets is used, it is vastly easy to deduct that particular item or set of items. The writer uses the same system with wash stands, an itemized schedule from cocks to solder, and the same methods for bath tubs, sinks, urinals, and all other ordinary fixtures. It is readily seen that by having the net cost of the fixtures with the trimming added to the floor line and the vents 2 ft. six inches from the trap, that this method saves a good deal of small detail work and guessing, besides saving a vast amount of time. If only one basin cock is used on a slab or some particular priced trap is specified, or some point of this sort comes up, it can more readily be taken care of in this way than in any other known to the writer; besides, this method does away with many uncertainties which some plumbers encounter when they figure soil pipe put up so much per foot, fixtures at list to allow for trimmings, etc. In the matter of trenching for sewer or water services, the writer usually estimates the digging per foot as the soil is very even in this section. But the pipe is always figured at net prices. The last and most important point of all is, of course, the labor. There is, however, one point to be considered in figuring labor, which if not taken into account will bankrupt the wealthiest plumber. It is not how many days *can* the plumber do it in, but how many days *will* he do it in. It will not do to be too great an optimist on labor. Take men as you find them, then figure a fair day's work, and then see that you get it. But recollect, after you have figured all your lines of pipe, all your fixtures and labor, then comes the riddle like that propounded by the Sphinx of old: How much profit shall I add? And those who fail to answer it, like the older victims, will perish; the difference, however, is, the plumber will perish of starvation in place of the shorter death of being gobbled up. Before figuring the profit expected on a plumbing contract, it is almost unnecessary to say that the items of material and labor should be closely looked over to see that nothing is left out or repeated. It is best, in the writer's judgment, to study the proposed job from water services to fixtures just as if he were doing this job himself in order to intelligently judge the amount of labor required on the work. It is always a

*Abstract of a paper read before the Master Plumbers' Association of Kansas City, Mo., by Dent Yates.

good plan, also, to remember that 10 per cent. profit on material and labor represents on a job of from $200 to $1,000 simply the shop expenses, allowing nothing for the master's expenses and time, and no plumber known to the writer ever made any money and kept it and stayed in business without getting from 25 per cent. upwards on contract work, including profits on extras of course.

Another thing, don't worry if some patent-leather plumber seems to be getting all the contract work in sight at cost or near it. He may dazzle your eyes with his new wagon and gilt sign; the travelling men may tell you that Skinner is a hustler; that he runs thirty-six men; that he has the Skylight flats and sixteen tenements in a row; don't let that sort of talk move you a peg. Do what little job work you can get, make your customers your friends, and make it a rule that if you cannot get the cost of work with your living added, to let that job go and try another job. Discount your bills and remember the railroad rule in taking contract work: In all cases of doubt take the safe side. Don't contract a job if you have any doubt whatever about getting your money. Don't imagine the mechanics' lien law will get you your money; it is little more than a bluff. A slippery lawyer and a slight technicality will put you in the position of the fellow that drove the hearse: He was not in it. Finally, the writer invariably goes over his work when it is finished to find out what the job did actually cost him. I believe that plumbers get tangled up, and into the clutches of the sheriff, for the reason that they get half way through a lot of work they are losing money on, and get a lot more at the same price, without knowing they are meeting their Waterloo when settlements become due.

HEATING BY HOT WATER.

WHEN the quantity of air to be heated per minute has been ascertained, says a writer in the *Plumber and Decorator*, the quantity of pipe that will be necessary to heat the room may be found by the following:

Multiply the excess of temperature of the flow-pipe above that of surrounding air by the difference between the temperature at which the room is purposed to be kept, when at its maximum, and the temperature of the external air, and divide this product by the difference between the temperature of the pipes and the purposed temperature of the room; then, the quotient thus obtained when multiplied by the number of cubic feet of air to be warmed per minute, and this divided by 222 (the number of cubic feet of air raised 1 deg. per minute by 1 ft. of 4 in. pipe) will give the number of feet in length of pipe 4 in. diameter, which will produce the desired effect.

When 3 in. pipes are used, the quantity of pipe required to produce the same effect will, of course, be different. To obtain it, the number of feet of 4 in. pipe obtained by the above rule must be multiplied by 1·33. If 2 in. pipe be used, the quantity of 4 in. pipe must be multiplied by two.

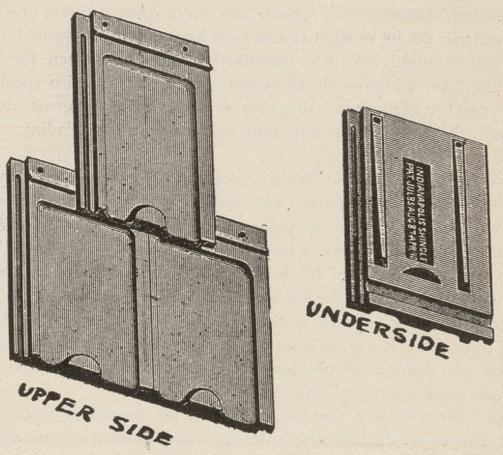
A well known company who make the manufacture of steam and hot water heaters a specialty, now advocate a different method of figuring greenhouses to the one heretofore employed; namely, by exposure; that is, counting in the entire exterior surface, glass, sides and ends. The old method was simply a consideration of the "glass surface" alone, and was liable to error through varying differences in the construction and location of the sides and ends. A table which is conservative and based on a large number of actual trials, shows the amount of square feet of pipe necessary to heat any given number of square feet of exposure to a maximum night temperature of 50 degrees, and also what will be necessary to heat the same amount of exposure to a higher temperature of 60 degrees; this latter being the highest that florists generally want. In computing the total exposure of the greenhouse, one-third of the square feet of the ends and exposed outside wall surface is added to the actual square feet of glass. After finding the number of square feet of piping that will be necessary to heat the house to the given temperature, then it is easy to transfer the square feet of pipe into linear feet of whatever size of pipe may be chosen. —*Master Steam Fitter.*

Mr. Harry G. Powell has opened an office as architect at Stratford, Ont.

MANUFACTURES AND MATERIALS

CLAY FOR SHINGLES.

WE reproduce from the *Clay Worker* cuts of a new shingle tile or "clay shingle" as it is called, which seems to be a great improvement upon the ordinary form in use here. Its general upper surface is depressed, leaving a raised rim wider on one side and grooved to receive a lip on the adjoining tile. The underside of the tile has two ribs, giving strength with lightness, and a groove near the botton edge forming a drip. It is claimed that these tiles so securely lock that the heaviest winds cannot lift them. The size is 7 x 10 inches, with an exposure of 6 x 8



inches. We would be glad to have an expression of opinion from our subscribers who are in the roofing business, or other practical men, as to the merits or otherwise of this tile.

There is little doubt but that a snow and waterproof tile of light weight and great strength would fill a long felt want. Slates are utterly unreliable as a protection against fire, even a moderate heat cracking them and exposing the wooden roof beneath, while wooden shingles are not durable enough for a first-class building, and unless laid on a bed of good mortar more dangerous in case of fire than slates.

ASPHALTE VERSUS TAR AND GRAVEL PAVEMENTS.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—Asphalte pavements are in danger of falling into disrepute, not because asphalte has been found wanting in any property necessary to the making of a good and durable pavement, but owing to a pernicious habit, either the outgrowth of ignorance or carelessness. I refer to the misleading statements to be met with daily in the columns of our newspapers, as furnished to them by corporate bodies and others to the effect "That an asphalte pavement is to be laid on such and such a street," when in reality the pavement is to be constructed of tar and gravel. It is not my intention to go into the respective merits of asphalte versus tar and gravel, as I think it would be an insult to the common sense of your readers to attempt to draw such a comparison, but simply to point out the injustice done to asphalte in general by having such inferior materials as tar and sand dignified by its name.

There are many brands of asphalte on the market, some of them I am sorry to say of an inferior quality; therefore I consider that it is quite sufficient for the genuine article to have to answer for the sins of these brands without being compelled to adopt those of such a primitive and out of date mixture as "tar and gravel."

Yours truly,

JUSTICE.

JOINTS FOR CAST-IRON PIPES.

THE ordinary method in this country for putting cast-iron water or waste pipes together is by a lead-caulked joint. This answers very well when the pipes lie quietly in the ground. But pipes do not lie quietly in all cases. And in houses where hot and cold water is alternately passing through the pipes, expansion and contraction come into play, and the result to the joints is anything but satisfactory. If a steam drip enters one of these pipes, the lead ring forming the packing of the joint will work out upon the pipe within a few months.

Pipes underground are liable to disturbance from a variety of causes. Leakage usually results from any movement of the pipe; with water-pipes these leakages are annoying and costly. If a cast-iron pipe happens to be carrying gas instead of water, the leakage at once becomes costly and dangerous.

The lead-caulked joint is costly, and at the same time difficult to make well in confined locations. In plumbing work it is no uncommon thing to